REMARKS

Applicants request favorable reconsideration of this application in view of the foregoing amendments and the following remarks. Claims 1, 7-22, and 24-28 were pending in the application and were rejected in the Office Action. By way of this response, claims 1, 21 and 22 have been amended, without adding new matter. In addition, claim 25 has been canceled without prejudice or disclaimer. No claims have been added. Therefore, claims 1, 7-22, 24, and 26-28 are respectfully submitted for further consideration.

35 U.S.C. 112 Rejections

Claims 1 and 7-25 are rejected under 35 U.S.C. § 112, second paragraph, as indefinite. Specifically, claims 1 and 21 are rejected for the phrase "substantially insoluble." Applicants have amended claims 1 and 21 to delete the phrase "substantially insoluble" and incorporate the term "nitrogen." In addition, claim 22 is rejected for failing to include proper antecedent basis for the phrase "the latter." Applicants have amended claim 22 to replace "the latter" with "the liquid." Accordingly, Applicants respectfully request a withdrawal of the rejection of claims 1, 7-22 and 24 under § 112, second paragraph.

Rejections Under 35 U.S.C. § 103(a)

Claims 1, 7-22 and 24-28 are rejected under 35 U.S.C. § 103(a) as unpatentable over Brilman *et al.* (WO 96/31409) in view of Dunn *et al.* (WO 96/33618).

Claims 1 and 21 are independent claims. Claim 1 presently recites a "container . . . filled with a liquid . . . dissolved therein a first gas, which container comprises . . . a cartridge . . . at least partially filled with a second gas . . . wherein the first gas is nitrous oxide, and the second gas is nitrogen." Amended claim 21 recites a method that includes, *inter alia*, "accommodating a cartridge . . . at least partially filled with nitrogen," "filling consumable liquid into the container," and "dissolving nitrous oxide in the liquid."

In rejecting the claims, the Office Action states the secondary reference teaches "that the nitrous oxide can be combined with other gases and the primary reference teaches that it is notoriously well known to use nitrogen in foaming beverage containers. Motivation has been

clearly stated in the form of case law." Office Action at p. 3, lines 16-18. However, the record evidences no motivation in the art to have combined the teachings of Brilman *et al.* and Dunn *et al.*

Brilman *et al.* discloses that an insoluble gas, such as nitrogen, is added to the surface of the liquid. See Brilman *et al.* at p. 1, lines 21-22. In contrast, Dunn *et al.* discloses dissolving a gas or gases in a beverage. See Dunn *et al.* at p. 1, lines 4-8.

First, because Brilman *et al.* merely teaches the addition of a single, indissoluble gas (nitrogen) to liquid, it would not have been obvious to add dissolvable gases, such as those disclosed in Dunn *et al.*, to the liquid in Brilman *et al.* Furthermore, Dunn *et al.* states that a "mixture of gases or a mixture of any of the aforementioned gases may be used. The beverage may be saturated or supersaturated with the gas or gases." Dunn *et al.* at p. 3, lines 17-19. Dunn *et al.* thus suggests that any mixture, whether it is a mixture of non-specified gases or a mixture of "aforementioned gases," is intended to be a mixture of *dissolvable* gases. Dunn *et al.* does not teach or suggest adding an indissoluble gas as part of the "mixture of gases."

Even were we to assume, for the sake of argument, that one of the gases in Dunn *et al.* could be indissoluble, the latter reference does not teach or suggest entering an indissoluble gas, such as nitrogen, into a cartridge. Rather, Dunn *et al.* would have suggested placing that indissoluble gas in the liquid.

In addition, The Dunn teaching is in some way confusing and puzzling. The first aspect of the Dunn *et al.* invention is directed to a method of producing a dispersion of bubbles in a milk-containing beverage. The method comprises *dissolution* of a gas in the beverage and sealing the beverage and *dissolved* gas in the container. *See* Dunn *et al.* at p. 2, lines 1-22. The second aspect of the Dunn *et al.* invention, there is provided a product comprising a pressurized beverage container containing a pressurized milk beverage, in which the beverage has a gas *dissolved* therein. For example, the gas may be nitrous oxide, carbon dioxide, HFC, or HCFC. *See* Dunn *et al.* at p. 2, line 2 to p. 3, line 5. For a skilled person, it is easy to understand how to use nitrous oxide because this gas is easily dissolvable. Yet,

Dunn *et al.* also discloses the use of HFC or HCFC instead of nitrous oxide. HFC and HCFC are less soluble than nitrous oxide in milk products. HFC and HCFC are fluorine- and chlorine-containing substances, however, which are responsible for the destroying part of the ozone layer. Thus, although admitted as propellants in aerosols in the past, HFC and HCFC are banned at least for the territory of Europe. Thus, the skilled person would disregard HFC or HCFC in the enumeration of gases of Dunn *et al.* on page 3, line 5, as a suggestion for use in the two preceding embodiments, which are both directed to *dissolvable* gases *only*.

As outlined above, Dunn *et al.* mentioned nitrous oxide, HFC and HCFC as useful gases for the second aspect of the invention. The teaching of Dunn, however, is merely directed to the *dissolution* of those gases, where HFC or HCFC are suggested to replace nitrous oxide. Further, Dunn *et al.* discloses that HFC and HCFC are described to be suitable to replace nitrous oxide. *See* Dunn *et al.* at p. 8, lines 28-31. Accordingly, the references fail to show that a mixture of a dissolvable gas and an indissoluble gas would be used. By the same token, the cited publications do not evidence motivation for the skilled artisan to have combined Brilman *et al.* and Dunn *et al.* in the manner suggested by the Office Action.

Second, the present invention requires the addition of nitrogen that is at least partly filled within a cartridge, the cartridge having at least one continuous hole for passage of gas. Nitrogen can be applied to a liquid within a can in different ways, such as by adding a drop of liquid nitrogen to the space of the liquid in a container. The nitrogen immediately starts to evaporate and creates an overpressure. The nitrogen serves as an inert medium that prevents oxidation reactions in the liquid. In contrast, such as disclosed in Brilman *et al.*, nitrogen will be introduced into the cartridge if the can is turned over allowing for the gas under pressure to enter the cartridge. *See* Brilman *et al.* at p. 1, lines 20-33. Subsequently, Brilman *et al.* describes that upon opening the container, a flow of small nitrogen bubbles will be displaced through the beer, thereby resulting in the formation of foam.

Starting from Dunn *et al.*, it would not have been obvious to one skilled in the art to add a cartridge in the beverage container of Dunn *et al.* and to introduce nitrogen to the beverage container prior to sealing. Dunn *et al.* suggests gasing up the beverage mixture with nitrous oxide to a level of between one and four volumes. Further, Dunn *et al.* discloses

broaching the container at a temperature of between 2° and 10° C. *See* Dunn *et al.* at p. 3, lines 27-28 and p. 8, lines 28-29. At such low temperatures, the solubility of nitrous oxide in the beverage is low and, therefore, a pressure will be found in the container between less than 0.5 and about 3.5 bar (at 5° C, with 1.55 fold volume of nitrous oxide, that pressure will be 0.5, as outlined in the attached table). Further, Dunn *et al.* describes that when the container is broached by opening the closure, the effect when pouring out the product from the container would be dramatic, and the product can expand to "over double its volume." Dunn *et al.* at p. 9, lines 4-16. Thus, the disclosure of Dunn *et al.* suggests that a stable foam head will be obtained by adjusting the amount of nitrous oxide. In practice, however, several drawbacks could be found. For example, if a two-fold volume of nitrous oxide is used, as disclosed to be typical to Dunn *et al.*, there is no overpressure within the liquid after opening the beverage can at temperatures recommended by Dunn *et al.* (2° and 10° C). As outlined in the attached table, a two-fold volume of nitrous oxide in the beverage will result in a pressure of about 1.0 bar at 5° C and about 1.3 bar at about 10° C. Thus, either no or only a low overpressure of about up to 3/10 bar is created. This overpressure is too low to induce the production of foam.

The Dunn reference evidences that nitrous oxide has a linear effect on foam volume, which means that doubling the amount of gas should double the amount of foam, in theory. Yet nitrous oxide also has a negative effect on foam stability; that is, the high solubility of nitrous oxide means that the gas escapes the foam bubbles by dissolving and diffusing into the atmosphere, with its essentially zero concentration of nitrous oxide. If, as posited in the Office Action, Dunn *et al.* suggested using a second gas and if nitrogen were selected as that second gas, then both gases would be added into the beverage as described by Dunn *et al.*

In that case, however, the nitrogen would immediately escape from the mixture, resulting in the undesired formation of foam before the can is sealed. In other words, a distinct technical drawback undercuts the Examiner's rationale for the alleged combination. The Examiner presumes an additive benefit as the motivation for the combination. As stated, nitrogen detracts from foam formation, however, and the references evidence no additive benefit of combining nitrogen and nitrous oxide.

To the contrary, the inventors discovered that the presently recited combination of "nitrous oxide," "nitrogen," and a "cartridge . . . at least partially filled with [that] nitrogen" provides an unexpected result: a large foam head of superior quality by virtue of improved foam stability, an effect not presaged by Dunn *et al.* *See* Application at p. 2, lines 4-5; p. 4, lines 15-26. In the present invention, the stability of the foam is high because nitrogen counteracts the tendency of foam bubbles to collapse. Nitrogen is present in the surrounding atmosphere and, therefore, does not diffuse into the atmosphere. This unexpected result rebuts the alleged *prima facie* case of obviousness.

Accordingly, Applicants submit that claims 1, 21 and their respective dependent claims are patentable under 35 U.S.C. § 103(a). For at least the aforementioned reasons, Applicants respectfully request a withdrawal of the rejections of claims 1, 7-22, 24 and 26-28 under § 103(a).

Conclusion

Applicants believe that the present application is now in condition for allowance. Favorable reconsideration of the application, as amended, is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicants hereby petition for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

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SOP Werkinstructie SCHMALBACH-LUBECA CONTINENTAL CAN EUROPE

Titel: N2O content in vol% in beverages

temperatuur in °C \ Druk in bar	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0
5	1.55	1.65	1.76	1.86	1.96	2.06	2.17	2.27	2.37	2.47	2.58	2.68	2.78	2.88	2.99	3.09	3.19	3.29	3.40	3.50	3.60	3.70	3.81	3.91	4.01	4.11
6	1.50	1.60	1.70	1.80	1.90	2.00	2.09	2.19	2.29	2.39	2.49	2.59	2.69	2.79	2.89	2.99	3.09	3.18	3.28	3.38	3.48	3.58	3.68	3.78	3.88	3.98
7	1.45	1.55	1.64	1.74	1.83	1.93	2.03	2.12	2.22	2.31	2.41	2.50	2.60	2.70	2.79	2.89	2.98	3.08	3.18	3.27	3.37	3.46	3.56	3.65	3.75	3.85
8	1.40	1.50	1.59	1.68	1.77	1.87	1.96	2.05	2.14	2.24	2.33	2.42	2.52	2.61	2.70	2.79	2.89	2.98	3.07	3.16	3.26	3.35	3.44	3.54	3.63	3.72
9	1.36	1.45	1.54	1.63	1.72	1.81	1.90	1.99	2.07	2.16	2.25	2.34	2.43	2.52	2.61	2.70	2.79	2.88	2.97	3.06	3.15	3.24	3.33	3.42	3.51	3.60
10	1.31	1.40	1.49	1.57	1.66	1.75	1.83	1.92	2.01	2.09	2.18	2.27	2.36	2.44	2.53	2.62	2.70	2.79	2.88	2.96	3.05	3.14	3.22	3.31	3.40	3.48
11	1.27	1.36	1.44	1.52	1.61	1.69	1.78	1.86	1.94	2.03	2.11	2.20	2.28	2.36	2.45	2.53	2.62	2.70	2.78	2.87	2.95	3.04	3.12	3.20	3.29	3.37
12	1.23	1.31	1.39	1.48	1.56	1.64	1.72	1.80	1.88	1.96	2.04	2.13	2.21	2.29	2.37	2.45	2.53	2.61	2.70	2.78	2.86	2.94	3.02	3.10	3.18	3.27
13	1.19	1.27	1.35	1.43	1.51	1.59	1.67	1.74	1.82	1.90	1.98	2.06	2.14	2.22	2.30	2.37	2.45	2.53	2.61	2.69	2.77	2.85	2.93	3.00	3.08	3.16
14	1.15	1.23	1.31	1.38	1.46	1.54	1.61	1.69	1.77	1.84	1.92	1.99	2.07	2.15	2.22	2.30	2.38	2.45	2.53	2.60	2.68	2.76	2.83	2.91	2.99	3.06
15	1.12	1.19	1.27	1.34	1.41	1.49	1.56	1.64	1.71	1.78	1.86	1.93	2.01	2.08	2.15	2.23	2.30	2.38	2.45	2.52	2.60	2.67	2.75	2.82	2.89	2.97
16	1.08	1.16	1.23	1.30	1.37	1.44	1.51	1.59	1.66	1.73	1.80	1.87	1.94	2.02	2.09	2.16	2.23	2.30	2.37	2.45	2.52	2.59	2.66	2.73	2.80	2.88
17	1.05	1.12	1.19	1.26	1.33	1.40	1.47	1.54	1.61	1.68	1.75	1.82	1.88	1.95	2.02	2.09	2.16	2.23	2.30	2.37	2.44	2.51	2.58	2.65	2.72	2.79
18	1.02	1.09	1.15	1.22	1.29	1.36	1.42	1.49	1.56	1.63	1.69	1.76	1.83	1.89	1.96	2.03	2.10	2.16	2.23	2.30	2.37	2.43	2.50	2.57	2.64	2.70
19	0.99	1.05	1.12	1.18	1.25	1.31	1.38	1.45	1.51	1.58	1.64	1.71	1.77	1.84	1.90	1.97	2.03	2.10	2.16	2.23	2.29	2.36	2.42	2.49	2.56	2.62
20	0.96	1.02	1.09	1.15	1.21	1.28	1.34	1.40	1.47	1.53	1.59	1.66	1.72	1.78	1.85	1.91	1.97	2.04	2.10	2.16	2.23	2.29	2.35	2.42	2.48	2.54
21	0.93	0.99	1.05	1.11	1.18	1.24	1.30	1.36	1.42	1.48	1.54	1.61	1.67	1.73	1.79	1.85	1.91	1.97	2.04	2.10	2.16	2.22	2.28	2.34	2.40	2.47
22	0.90	0.96	1.02	1.08	1.14	1.20	1.26	1.32	1.38	1.44	1.50	1.56	1.62	1.68	1.74	1.80	1.86	1.92	1.98	2.03	2.09	2.15	2.21	2.27	2.33	2.39
23	0.88	0.93	0.99	1.05	1.11	1.16	1.22	1.28	1.34	1.40	1.45	1.51	1.57	1.63	1.69	1.74	1.80	1.86	1.92	1.97	2.03	2.09	2.15	2.21	2.26	2.32
24	0.85	0.91	0.96	1.02	1.07	1.13	1.19	1.24	1.30	1.36	1.41	1.47	1.52	1.58	1.64	1.69	1.75	1.80	1.86	1.92	1.97	2.03	2.09	2.14	2.20	2.25
25	0.83	0.88	0.93	0.99	1.04	1.10	1.15	1.21	1.26	1.32	1.37	1.42	1.48	1.53	1.59	1.64	1.70	1.75	1.81	1.86	1.92	1.97	2.02	2.08	2.13	2.19
26	0.80	0.85	0.91	0.96	1.01	1.07	1.12	1.17	1.22	1.28	1.33	1.38	1.44	1.49	1.54	1.60	1.65	1.70	1.75	1.81	1.86	1.91	1.97	2.02	2.07	2.13
27	0.78	0.83	0.88	0.93	0.98	1.04	1.09	1.14	1.19	1.24	1.29	1.34	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.76	1.81	1.86	1.91	1.96	2.01	2.06
28	0.76	0.81	0.86	0.91	0.96	1.01	1.06	1.11	1.16	1.21	1.26	1.31	1.36	1.41	1.46	1.51	1.56	1.61	1.66	1.71	1.76	1.81	1.86	1.91	1.96	2.01
29	0.73	0.78	0.83	0.88	0.93	0.98	1.03	1.07	1.12	1.17	1.22	1.27	1.32	1.37	1.41	1.46	1.51	1.56	1.61	1.66	1.71	1.75	1.80	1.85	1.90	1.95
30	0.71	0.76	0.81	0.86	0.90	0.95	1.00	1.04	1.09	1.14	1.19	1.23	1.28	1.33	1.37	1.42	1.47	1.52	1.56	1.61	1.66	1.70	1.75	1.80	1.85	1.89
31	0.69	0.74	0.79	0.83	0.88	0.92	0.97	1.01	1.06	1.11	1.15	1.20	1.24	1.29	1.34	1.38	1.43	1.47	1.52	1.57	1.61	1.66	1.70	1.75	1.79	1.84
32	0.67	0.72	0.76	0.81	0.85	0.90	0.94	0.99	1.03	1.08	1.12	1.17	1.21	1.25	1.30	1.34	1.39	1.43	1.48	1.52	1.57	1.61	1.66	1.70	1.74	1.79
33	0.66	0.70	0.74	0.79	0.83	0.87	0.92	0.96	1.00	1.05	1.09	1.13	1.18	1.22	1.26	1.31	1.35	1.39	1.44	1.48	1.52	1.57	1.61	1.65	1.70	1.74
34	0.64	0.68	0.72	0.76	0.81	0.85	0.89	0.93	0.98	1.02	1.06	1.10	1.14	1.19	1.23	1.27	1.31	1.35	1.40	1.44	1.48	1.52	1.57	1.61	1.65	1.69
35	0.62	0.66	0.70	0.74	0.78	0.83	0.87	0.91	0.95	0.99	1.03	1.07	1.11	1.15	1.19	1.24	1.28	1.32	1.36	1.40	1.44	1.48	1.52	1.56	1.60	1.65
36	0.60	0.64	0.68	0.72	0.76	0.80	0.84	0.88	0.92	0.96	1.00	1.04	1.08	1.12	1.16	1.20	1.24	1.28	1.32	1.36	1.40	1.44	1.48	1.52	1.56	1.60
37	0.59	0.63	0.67	0.70	0.74	0.78	0.82	0.86	0.90	0.94	0.98	1.01	1.05	1.09	1.13	1.17	1.21	1.25	1.29	1.33	1.36	1.40	1.44	1.48	1.52	1.56
38	0.57	0.61	0.65	0.69	0.72	0.76	0.80	0.84	0.87	0.91	0.95	0.99	1.03	1.06	1.10	1.14	1.18	1.21	1.25	1.29	1.33	1.37	1.40	1.44	1.48	1.52
39	0.56	0.59	0.63	0.67	0.70	0.74	0.78	0.81	0.85	0.89	0.92	0.96	1.00	1.03	1.07	1.11	1.15	1.18	1.22	1.26	1.29	1.33	1.37	1.40	1.44	1.48
40	0.54	0.58	0.61	0.65	0.69	0.72	0.76	0.79	0.83	0.86	0.90	0.94	0.97	1.01	1.04	1.08	1.11	1.15	1.19	1.22	1.26	1.29	1.33	1.37	1.40	1.44

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